

CLAIMS

1.- LIFO storage device used to receive and dispense coins or tokens, of the type comprising:

- 5 • at least one tube (1) for storing coins or tokens arranged to form a stack;
- an upper opening (2) in said tube (1) for the entry and exit of coins or tokens;
- an inlet conduit (3) for coins or tokens with an outlet faced said upper opening (2);
- 10 • a mobile support (4) inside tube (1) to support said stack of coins or tokens;
- driving means that include a nut (5) and spindle (6) mechanism for moving mobile support (4) together with the stack of coins or tokens up and down inside said tube (1) in order to receive and dispense coins or tokens, respectively; and
- 15 • expulsion means driven to expel the top coin in the stack, adjacent to upper opening (2) of tube (1), towards an outlet,

characterised in that it comprises:

- 20 • at least two of said tubes (1) forming a set of tubes (1) arranged in relation to spindle (6);
- respective mobile supports (4) inside tubes (1) and connected to said nut (5) and spindle (6) mechanism;
- a support (7) in which said inlet conduit (3) and said expulsion means are mounted; and
- 25 • driving means for producing a relative movement between said set of tubes (1) and said support (7) which places said tubes sequentially in different relative positions, in each of which said outlet of inlet conduit (3) lies faced upper opening (2) of one of tubes (1), of which there are at least two, and the expulsion means lie faced upper opening (2) of another of said tubes (1).
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2.- Device according to claim 1, characterised in that spindle (6) is parallel to tubes (1).

- 3.- Device according to claim 2, characterised in that said tubes (1) are arranged at equal angular intervals around spindle (6) and at equal distances from the axis of spindle (6).

4.- Device according to claim 3, characterised in that the walls of said tubes (1) and the respective slots (1b), of which there are at least two, are formed by means of at least one body (30), made up of at least one part.

5 5.- Device according to claim 3 or 4, characterised in that each mobile support (4) is connected to said nut (5) by means of an arm (4a) passed through a longitudinal slot (1b) of the respective tube (1), and nut (5) is coupled to spindle (6).

10 6.- Device according to claim 5, characterised in that said support (7) is arranged to rotate in relation to a coaxial axis with spindle (6) and said driving means are adapted to rotate support (7) in both directions and place it sequentially in different angular positions in relation to the set of tubes (1) corresponding to said different relative positions.

15 7.- Device according to claim 6, characterised in that said expulsion means comprise an upper end stop element (8) guided to move freely with respect to support (7) in a direction parallel to the axis of tube (1) in order to make contact with the top coin or token in the corresponding stack or with part of the edge of upper opening (2), and at least one expulsion element (9) linked to said upper end stop element (8).

20 8.- Device according to claim 7, characterised in that said expulsion element (9) is driven to move in a transverse direction to the stack of coins or tokens, dragging the top coin or token in the stack.

9.- Device according to claim 8, characterised in that said expulsion element (9) is linked to upper end stop element (8) and projects underneath it for a length that is less than the thickness of the coins or tokens.

25 10.- Device according to claim 9, characterised in that it includes means for lifting upper end stop element (8) with respect to support (7) and then letting it drop onto the top coin or token in the following stack in passing from one angular position to the following angular position.

30 11.- Device according to claim 10, characterised in that each tube (1) includes an extendible upper portion (1a) that can be moved coaxially with respect to tube (1) without the possibility of rotation and without affecting the stack of coins or tokens inside tube (1), each extendible upper portion (1a) including a projection (10) attached to a guide groove (11) on support (7) at a suitable height for keeping extendible upper portion (1a) in a position of maximum extension, with said projection (10) being able to be attached to another guide

groove (12) associated with upper end stop element (8) when said upper end stop element (8) is in a position of maximum lift between one angular position and the following angular position to link the movements of extendible upper portion (1a) to the movements of upper end stop element (8).

5 12.- Device according to claim 11, characterised in that in each extendible upper portion (1a) said upper opening (2) is defined and it comprises an outlet notch (2a) on one edge of said upper opening (2) that is appropriately sized to allow a coin or token to pass through edgeways.

10 13.- Device according to claim 12, characterised in that said means for lifting and then letting upper end stop element (8) drop with respect to support (7), include a cam surface (13) arranged perimetricaly around the set of tubes (1) and a cam follower (14) that is connected to upper end stop element (8) and can rest in a sliding or rolling manner of said cam surface (13), which defines an elevation (13a) between each angular position corresponding to one tube (1) and
15 the angular position corresponding to the following tube (1).

14.- Device according to claim 13, characterised in that the downward movement of upper end stop element (8) with respect to support (7) is gravitational.

20 15.- Device according to claim 13, characterised in that the downward movement of upper end stop element (8) with respect to support (7) is driven by the force of an elastic element that is loaded during the upward movement.

16.- Device according to claim 13, characterised in that spindle (6) is operatively connected to said rotary driving means for support (7).

25 17.- Device according to claim 16, characterised in that said rotary driving means are provided to rotate spindle (6) and support (7) in unison selectively in one rotation direction or another.

18.- Device according to claim 17, characterised in that the thread pitch of spindle (6) is such that nut (5), in a complete turn, produces a movement equal to the thickness of a coin or token.

30 19.- Device according to claim 18, characterised in that said rotary driving means include an electric motor (15) connected to support (7) by a transmission, and an attachment between support (7) and spindle (6).

20.- Device according to claim 19, characterised in that said transmission comprises a belt (16) or chain arranged between a driving pulley (17) attached to
35 the output shaft of the motor and a driven pulley (18) attached to support (7)

coaxially vis-à-vis spindle (6), said driven pulley (18) including a central passage (3a) so that said coin or token inlet conduit (3) extends into a section (3b) tilted downwards and outwards, ending in an opening that can lie faced upper opening (2) of each tube (1) in the different angular positions.

- 5 21.- Device according to claim 19, characterised in that said transmission comprises a direct or indirect gear between a toothed driving wheel attached to the output shaft of the motor and a toothed driven wheel attached to support (7) coaxially vis-à-vis spindle (6), said toothed driven wheel including a central passage so that said coin or token inlet conduit (3) extends into a section (3b) 10 tilted downwards and outwards, ending in an opening that can lie faced upper opening (2) of each tube (1) in the different angular positions.

22.- Device according to claim 8, characterised in that it comprises driving means dedicated to said driving action of expulsion element (9).

- 23.- Device according to claim 22, characterised in that said dedicated 15 driving means comprise an electromagnet (20) connected to expulsion element (9), which is guided to move in a substantially radial direction with respect to the axis of spindle (6) and move the top coin or token in the stack through said outlet notch (2a).

- 24.- Device according to claim 23, characterised in that expulsion element 20 (9) is joined to upper end stop element (8) and both are guided to be moved together by said electromagnet (20).

25.- Device according to claim 8, characterised in that said driving action of expulsion element (9) is linked to said rotary driving means of support (7) and spindle (6).

- 26.- Device according to claim 25, characterised in that expulsion element 25 (9) includes at least one thrusting tab (21) attached to upper end stop element (8) and provided to make contact on one side of the edge of the top coin or token in the stack when mobile support (7) rotates, and press the top coin or token against an oblique stationary surface (19) on the opposite side to slide it through said 30 outlet notch (2a).

27.- Device according to claim 26, characterised in that on said edge of upper opening (2) at least one pair of notches (2b) are provided to allow the passage of said thrusting tab (21), of which there is at least one.

- 28.- Device according to claim 11, characterised in that each extendible 35 upper portion (1a) has next to its lower edge a series of parallel longitudinal

grooves between which fingers (22) are defined and housed in a sliding manner in corresponding parallel longitudinal grooves, formed in the corresponding stationery part of tube (1).

29.- Device according to claim 1 or 20 or 21, characterised in that the coin or token inlet conduit (3), with a downward tilted section (3b) ending in an opening that can lie faced upper opening (2) of each tube (1) in the different angular positions, consists of a body (31) made up of at least one part.

5 30.- Device according to claim 29, characterised in that the said tilted section (3b) also adopts a spiral configuration, with an upper reinforcement (32) at the end of its projection.

10 31. Device according to any of the preceding claims, characterised in that each tube (1) is made up of various modular sections provided with releasable joining means (33) that make it possible to adapt the coin or token storage capacity by adding or removing modular sections according to the particular application.

15 32.- Device according to any of the preceding claims, characterised in that it includes sensors that detect the passage of incoming and/or exiting coins or tokens, connected to a meter device.